Personal Restraint System

Description

Technical scope of the invention

The invention relates to a personal restraint system for a seating position in a motor vehicle according to the preamble of claim 1.

Prior art

Such a personal restraint system is known from US 5,123,673. In addition to the currently conventional 3-point belt system, it provides for another 2-point belt system which is arranged in such a manner that the belt webs of the two belt systems cross in the chest region of the occupant. There therefore arises a 4-point belt system as a whole. Compared to the currently conventional 3-point belt system, such a 4-point belt system has the advantage of a substantially better protective action in the event of a side impact.

Of course, such a 4-point belt system can only exhibit its improved protective effect when the occupant uses it in accordance with regulations, that is to say, when both the 3-point system and the 2-point system are closed. In any case, it is necessary to prevent the occupant from putting on the 2-point system exclusively, because not only is there no improvement in this case, but this represents an even worsened protective effect compared to the usual 3-point system.

Subject matter of the invention

Proceeding from here, it is the object of the invention to further develop such a personal restraint system to the effect that it becomes impossible for the occupant

to belt himself/herself exclusively with the 2-point belt system. This must happen in a manner that rescue of the occupant is not impaired in the event of an accident.

This objective is achieved by a personal restraint system having the features of claim 1.

The roller of the 2-point system of the personal restraint system according to invention demonstrates a blocking device that prevents the belt web of the 2-point belt system from being pulled out when the 3-point system isn't closed. To keep this roller from also being blocked when the 3-point belt is released first during unbuckling, the blocking is again lifted as soon as the 2-point system is also closed. In other words, blocking of this roller occurs only when both belt webs are wound up on their respective roller.

Pursuant to claim 2, the blocking device for the roller of the 2-point belt system preferably operates magnetically.

As already presented, it is necessary to detect whether the two belt webs are in their respective rolled up or unrolled states. This can be accomplished either pursuant to claim 3 by sensors in the belt buckles or pursuant to claim 4 by sensors in the rollers themselves.

Brief description of the drawings

The invention will now be explained in more detail based on exemplary embodiments referring to the figures. The drawing shows:

Figure 1 A roller comprising a magnetically operated blocking device in the non-blocked state,

Figure 2 the roller of Figure 1 in the blocked state,
Figure 3 the logic diagram on which the control of the blocking device is based,
Figure 4 a schematic diagram of the complete personal restraint system in accordance with a first exemplary embodiment,
Figure 5 a schematic diagram of the complete personal restraint system in accordance with a second exemplary embodiment and
Figure 6 a seat with a 4-point belt system.

Description of preferred embodiments

Figure 6 shows a vehicle seat 50, which demonstrates a 4-point belt system. This 4-point belt system consists of a 3-point belt system 10 and a 2-point belt system 20. The 3-point system is constructed in a conventional manner and comprises a first belt web 12, which extends between a first roller 18 and a fastener 17. Moreover, the first belt web 12 carries a first belt tongue 14, which can be inserted into a first belt buckle 16.

The upper and lower fastening points of the 3-point belt system and the 2-point system can be arranged directly on the seat as well as on external points of the vehicle structure. The B-pillar or C-pillar or even the roof structure come into consideration for the upper fastening points. The seat itself, the seat rail or even the floor assembly of the vehicle offer themselves for the lower fastening points.

In the 2-point belt system 20, the second belt web 22 extends from the second roller 28 to a second belt tongue, which here is inserted into the second belt buckle 26.

According to invention, the second roller 28 demonstrates a blocking device as depicted in Figures 1 and 2. This blocking device is independent of the furthermore present emergency-case blocking device, which in general operates both belt-web-sensitive and acceleration-sensitive. The blocking device depicted here serves exclusively for the purpose of keeping the occupant from buckling himself/herself exclusively with the 2-point belt system.

The blocking device of this exemplary embodiment comprises a toothed wheel 32, which is rigidly connected to the belt drum 30 and can be blocked in the unwinding direction by means of the blocking lever 34. For this, the blocking lever 34 is swivel-mounted around the axle 35. The blocking lever 34 has two arms 34a and 34b. The first arm 34a is connected to a tension spring 38, which pulls the blocking lever 34 into a position in which the catch 34c does not engage the toothed wheel 32. In this state, there is no blocking of the second roller. The second blocking lever 34b is mechanically linked to the electromagnet 36. If the electromagnet 36 is switched on, then it pulls the second arm 34b and the blocking lever 34 swivels into a position in which the catch 34c engages the toothed wheel 32; then the second roller is blocked.

The control of the electromagnet 36 proceeds according to a logic system as illustrated in Figure 3. If the belt of the 2-point belt system 20 has been put on, then the electromagnet 36 is turned off and the second roller 28 is not locked. If the belt of the 2-point belt system 20 has not been put on, then the electromagnet 36 is turned on if the belt of the 3-point system 10 has also not been put on. If , however, the belt of the 3-point belt system 10 is put on, the blocking of the second roller 28 is lifted.

This logic produces the following: If the occupant would first like to belt himself/herself with the 2-point belt system, then this isn't possible because of the blocking

of the second roller 28. As soon as the occupant has put on the belt of the 3-point system, then the blocking is lifted and the belt of the 2-point system can be put on. The unblocked state of the second roller 28 is maintained until both belts are released, so that it does not matter in what sequence the two belt buckles are opened when climbing out or also in the event of an accident. The fact that the blocking of the second roller 28 is always lifted in a de-energized state ensures that the second roller is also not blocked in the event that the power supply of the vehicle is interrupted during an accident.

Figures 4 and 5 indicate two examples, how the necessary information concerning the state of the belt webs (wound up, not wound up) can be obtained. In the context of the logic diagram just stated, belt web wound up on the roller means: belt not put on; belt unwound from the respective roller: belt put on.

Figure 4 indicates an example in which the necessary information concerning the state of the belt webs is obtained by sensors in the belt buckles 16 and 26. Here the message "belt tongue in belt buckle" is equivalent to "belt unwound from roller," that is to say, the belt has been put on. The signals of the sensors in the belt buckles 16, 26 are fed to the logic unit 40, which in turn controls the electromagnet 36 in the second roller 28.

In the exemplary embodiment shown in Figure 5, the necessary information is detected by revolution counters in the rollers 18 and 28. Here for example, the signal "belt put on" can be generated when the belt web has unwound a particular number of revolutions, such as two, from the respective roller.

Mixtures of the exemplary embodiments shown in Figures 4 and 5 are also conceivable, possibly to the effect that the information

about the state of the 3-point belt system 10 is obtained by a sensor in the first belt buckle 16 and the information about the state of the 2-point belt system by a counter in the second roller 28.

List of reference characters

10	3-point belt system
12	first belt web
14	first belt tongue
16	first belt buckle
17	fastener
18	first roller
20	2-point belt system
22	second belt web
24	second belt tongue
26	second belt buckle
28	second roller
30	belt drum
32	toothed wheel
34	blocking lever
34a	first arm
34b	second arm
34c	catch
36	electromagnet
38	tension spring
40	logic unit
50	vehicle seat

Claims

1. Personal restraint system for a seating position in a motor vehicle comprising:
   - a 3-point belt system (10) comprising a first roller (18), a first belt web (12) having a first belt tongue (14), and a first belt buckle (16),
   - a 2-point belt system (20) comprising a second roller (28), a second belt web (22) having a second belt tongue (24), and a second belt buckle (26),

   characterized in that the second roller (28) demonstrates a blocking device which blocks the second roller (28) when both belt webs (12, 22) are wound up on their respective roller (18, 28).

2. Personal restraint system according to claim 1, characterized in that the blocking device operates electromagnetically.

3. Personal restraint system according to one of the claims 1 or 2, characterized in that a sensor, which detects whether a belt tongue (14, 24) is situated within the belt buckle, is disposed in at least one belt buckle (16, 26).

4. Personal restraint system according to one of the preceding claims, characterized in that at least one roller (18, 28) is equipped with a revolution counter.

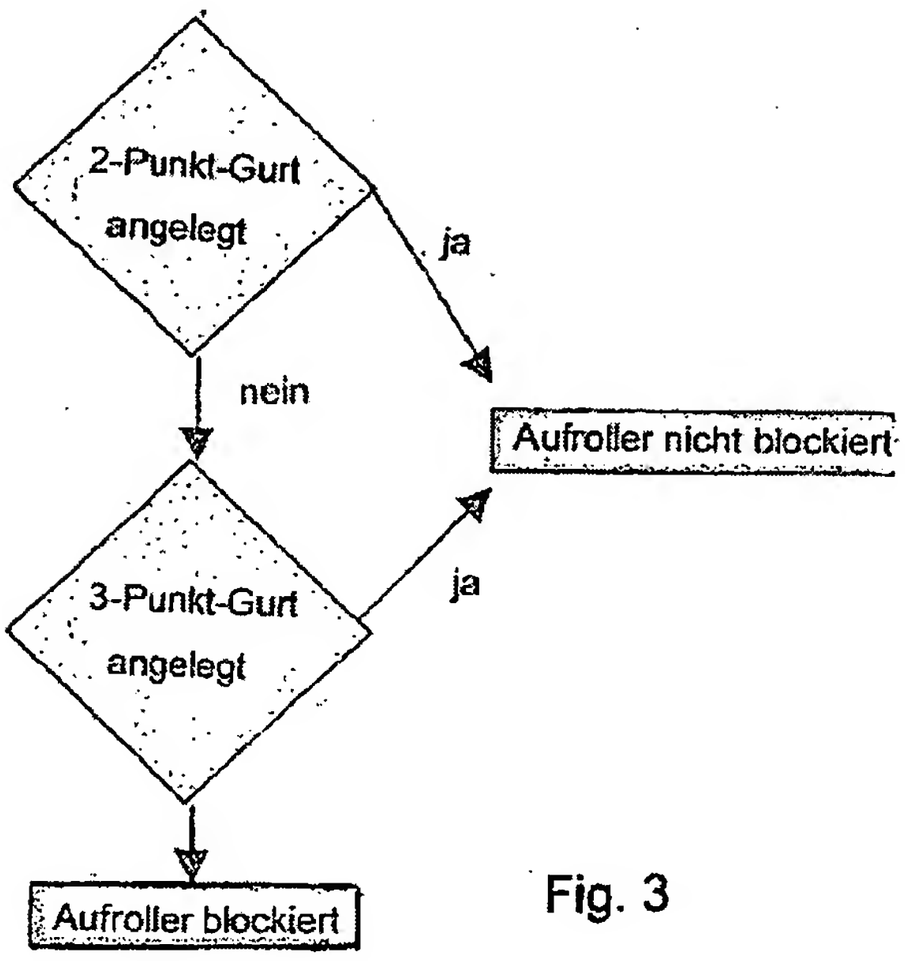

Fig. 3

German	English
2-Punkt-Gurt angelegt	2-point belt put on
3-Punkt-Gurt angelegt	3-point belt put on
ja	yes
Aufroller nicht blockiert	Roller not blocked
Aufroller blockiert	Roller blocked
nein	no